Claims

What is claimed is:

1. A method for lift off Gallium Nitride (GaN) pseudomaske epitaxy layer using wafer bonding way comprising the steps of:

(1) Depositing a low temperature buffer layer on a substrate;

(2) Depositing a mask layer on said low temperature buffer layer of step(1)

(3)Etching a pattern on said mask layer of step(2)

(4)Processing epitaxy lateral overgrowth(ELOG) GaN on etched mask layer of step(3) obtaining a smoothed surface to form a GaN epitaxy layer;

(5)obtaining a transferred substrate after clean process by using wafer bonding to connect with said GaN epitaxy layer; and

(6)Immersing said substrate, said low temperature buffer layer, said mask layer, said GaN epitaxy layer and said transferred substrate in etching solution and then said substrate, said low temperature buffer layer and said GaN epitaxy layer by using stress concentration of thermal expansion coefficient of said transferred substrate to separate from said transferred substrate.

2. The method according to claim 1, wherein material of said substrate is selected from the group consisting of Sapphire, Silicon Carbide(SiC) and Silicon(Si).

3. The method according to claim 1, wherein said low temperature buffer layer comprises depositing GaN or Aluminum Nitride (AlN) with a thickness in the range of 200-500 microns by a temperature of 600-700 degrees Celsius and then depositing 1.5 micron-thick GaN by temperature in the range of 1000-1100 degrees Celsius.

4. The method according to claim 1, wherein said mask layer is selected from the group consisting of SiO_2, Si_3N_4 and tungsten (W).

5. The method according to claim 1, wherein said pattern is selected from the group consisting of a dot pattern and line pattern.

6. The method according to claim 1, wherein said GaN epitaxy layer comprises epitaxy lateral overgrowth (ELOG) on mask layer with the range of 1000-1100 degrees Celsius.

7. The method according to claim 1, wherein said transferred substrate is a Silicon(Si).

8. The method according to claim 1, wherein said wafer bonding of step(5) is carried out using a temperature depending on said transferred substrate.

9. The method according to claim 1, wherein selecting of said etching solution of step(6) is carried out depending on said mask layer and said transferred substrate.